MODULE DESCRIPTOR

Module Title

Renewable Energy Technologies

Reference	ENM275	Version	1
Created	February 2023	SCQF Level	SCQF 11
Approved	June 2023	SCQF Points	15
Amended		ECTS Points	7.5

Aims of Module

This module aims to demonstrate critical awareness and understanding of the advanced technologies implemented in the transformation of renewable energy into clean electricity, the technologies implemented in the transportation of this electricity to grid, and the energy storage technologies used to address challenges to the grid-integration of renewable electricity. This module also aims to demonstrate the economics of renewable-based energy systems.

Learning Outcomes for Module

On completion of this module, students are expected to be able to:

1	Appraise the role of renewable energy technologies in the ongoing energy transition.
2	Analyse the prospects and challenges of renewable energy technologies and the fundamentals of renewable energy conversion into electricity.
3	Evaluate the advanced technologies applied in the transportation of renewable-electricity and the role of energy storage in addressing its grid-integration challenges.
4	Make informed judgement on the economics of operating renewable-based electrical power systems.

Indicative Module Content

An overview of the world's energy resources and electricity generation from the different energy sources with the associated environmental concerns leading to the ongoing energy transition. Renewable Energy Technologies prospects and challenges including their life cycle sustainability. Principles of energy conversion and electricity generation from the different renewable sources with a focus on Wind and Solar energy systems. The AC & DC technologies applied in the transportation of the renewable-electricity. Challenges to the large-scale grid-integration of renewable-electricity and the role of energy storage technologies in addressing these challenges, with focus on the potential of green hydrogen energy storage and fuel cells technologies. Economics of operating Renewable-Based power systems.

Module Ref:	ENM275 v1

Module Delivery

This module is delivered in both blended learning full-time and online learning part-time modes. For the blended learning full-time students, the module will use in-person lectures and tutorials. For online learning part-time students, the module will use online lectures and tutorials. Both cohorts will engage in case study work and forum discussions.

Indicative Student Workload	Full Time	Part Time
Contact Hours	35	35
Non-Contact Hours	115	115
Placement/Work-Based Learning Experience [Notional] Hours	N/A	N/A
TOTAL	150	150
Actual Placement hours for professional, statutory or regulatory body		

ASSESSMENT PLAN

If a major/minor model is used and box is ticked, % weightings below are indicative only.

Component 1

Type:	Coursework	Weighting:	100%	Outcomes Assessed:	1, 2, 3, 4
Description:	Individual Written Report				

MODULE PERFORMANCE DESCRIPTOR

Explanatory Text

Component 1 comprises 100% of the module grade. To pass the module, a D grade is required.

Module Grade	Minimum Requirements to achieve Module Grade:
A	A
B	B
C	C
D	D
E	E
F	F
NS	Non-submission of work by published deadline or non-attendance for examination

Module Requirements

Prerequisites for Module	A background in engineering is beneficial.
Corequisites for module	None.
Precluded Modules	None.

INDICATIVE BIBLIOGRAPHY

1. TWIDELL, J., 2022. Renewable energy resources. Routledge.
2. TAVNER, P., 2012. Offshore Wind Turbines: Reliability. Availability and Maintenance, The Institution of Engineering and Technology, London, UK.
3. BANSAL, R. ed., 2017. Handbook of Distributed Generation: Electric Power Technologies, Economics and Environmental Impacts. Springer.
4. JONES, L.E., 2017. Renewable energy integration: practical management of variability, uncertainty, and flexibility in power grids. Academic Press.
5. RASHID, M.H., 2016. Electric Renewable Energy Systems. Academic Press.
6. PITT, E., 2009. Assessment of Performance of Wave Energy Conversion Systems: Marine Renewable Energy Guides. Department of Energy and Climate Change.
7. THEODORE, W., 2014. Electrical machines, drives and power systems. Pearson.